

85-1038-14198  
891

COMINCO LTD.

EXPLORATION

WESTERN DISTRICT

NTS: 82 F/9 and  
82 F/16W

GEOPHYSICAL REPORT

ON

UTEM SURVEY ON THE

VULCAN 4 TO 11 and REDD 1 TO 3 CLAIMS

FORT STEELE MINING DIVISION, B.C.

- ASSESSMENT REPORT -

FILMED

Latitude : 49°45'N

Longitude : 116°18'W 22'

Work Performed by : I. Jackisch, J.J. Lajoie, and A.P. O'Hara

Claim Owner & Operator : COMINCO LTD.

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

14,198

PART 1 OF 2

OCTOBER 1985

J. SILIC

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VULCAN 4 TO 11 and REDD 1 TO 3 CLAIMS  
FORT STEELE MINING DIVISION, B.C.

LIST OF CLAIMS

Cominco Interest - 100%

The claims listed below are partially covered by the grid or adjoin those claims partially covered by the grid.

<u>GRID NAME</u>	<u># OF UNITS</u>	<u>RECORD #</u>	<u>ASSESSMENT WORK DUE</u>
Vulcan 4	18	1739	December 15, 1995
5	12	1740	December 15, 1995
6	18	1741	December 15, 1995
7	6	1742	December 15, 1995
8	20	2027	December 15, 1995
9	18	2286	October 16, 1988
10	10	2287	October 16, 1990
11	12	2288	October 16, 1990
Redd 1	15	2289	October 16, 1988
2	15	2290	October 16, 1989
3	9	2291	October 16, 1988

## INTRODUCTION

The Vulcan 4 to 11 and Redd 1 to 3 claims are located approx. in the area of the junction of White Creek and St. Mary's River (see Plate 289-85-1). Access is approx. 45 km west by logging road, from Kimberley, B.C. along the St. Mary's River.

Over the past 25 years a variety of geological, geochemical and geophysical surveys and diamond drilling have been done in the general area with no significant discoveries. The purpose of the UTEM survey was to try to locate conductors at greater depth than obtainable by previously used geophysical methods.

The Vulcan and Redd Claims are underlain by the clastic sediments of the Middle and Lower Aldridge formation of Proterzoic age. The sediments of the Aldridge formation are known to host the Sullivan orebody near Kimberley, B.C.

## DESCRIPTION OF UTEM SYSTEM

UTEM is an acronym for "University of Toronto ElectroMagnetometer". The system was developed by Dr. Y. Lamontagne (1975) while he was a graduate student of that University.

The field procedure consists of first laying out a large loop of single strand insulated wire and energizing it with current from a transmitter which is powered by a 1.7 kW motor generator. Survey lines are generally oriented perpendicular to one side of the loop and surveying can be performed both inside and outside the loop. The field procedure is similar to Turam, a better known electromagnetic surveying method.

The transmitter loop is energized with a precise triangular current waveform at a carefully controlled frequency (30.974 Hz for this survey). The receiver system includes a sensor coil and backpack portable receiver module which has a digital recording facility on cassette magnetic tape. The time synchronization between transmitter and receiver is achieved through quartz crystal clocks in both units which must be accurate to about one second in 50 years.

The receiver sensor coil measures the vertical magnetic component of the electromagnetic field and responds to its time derivative. Since the transmitter current waveform is triangular, the receiver coil will sense a perfect square wave in the absence of geologic conductors. Deviations from a perfect square wave are caused by electrical conductors which may be geologic or cultural in origin. The receiver stacks any pre-set number of cycles in order to increase the signal to noise ratio.

The UTEM receiver gathers and records 9 channels of data at each station. The higher number channels (7-8-9) correspond to short time or high frequency while the lower number channels (1-2-3) correspond to long time or low frequency. Therefore, poor or weak conductors will respond on channels 9, 8, 7 and 6. Progressively better conductors will give responses on progressively lower number channels as well. For example, massive, highly conducting sulphides or graphite will produce a response on all nine channels.

It was mentioned above that the UTEM receiver records data digitally on a cassette. This tape is played back into a computer at the base camp. The computer processes the data and controls the plotting on an 11" x 15" graphics plotter. Data are portrayed on data sections (D.S.) as profiles of each of the nine channels, one section for each survey line.

### FIELD WORK

The UTEM survey in this report covers an area of approx. 2.5 km x 9 km. The 20 lines surveyed are all between 1.7 to 1.8 km long, with regular station spacings of 50 metres. The 6 loops and 20 lines were so placed, so that the prospective horizons would be covered.

A total of 54 km were surveyed during June and July, 1985. The vertical component (Hz) was read at every station. Eight channels of information were acquired and plotted at each station (D.S. 1 to 21).

### DATA PRESENTATION

The results of the survey are presented on one claim & grid location map, one compilation map and 21 data sections.

The maps are listed as follows:-

Plate 289-85-1 (in envelope)	Claims & Grid Location Map Scale 1:50,000
Plate 289-85-2 (in envelope)	UTEM Compilation Map Scale 1:10,000

Legends for both the UTEM compilation map and the data sections are also attached.

In order to reduce the field data, the theoretical primary field of the loop must be computed at each station. The normalization of the data is as follows:-

a) For Channel 1:

$$\% \text{ Ch.1 anomaly} = \frac{\text{Ch.1} - P}{P} \times 100$$

where P is the primary field from the loop at the station and Ch.1 is the observed amplitude of Channel 1

b) For remaining Channels (n = 2 to 8)

$$\% \text{ Ch.n anomaly} = \frac{(\text{Ch.n} - \text{Ch.1})}{\text{Ch.1}} \times 100$$

where Ch.n is the observed amplitude of Channel n (2 to 8)

### INTERPRETATION

All the field results are displayed in the data sections on 21 diagrams (D.S. 1 to 21) with a computation of all relative points on Plate 289-85-2.


A number of crossover type anomalies were seen in the data. The low channel (Channels 1 to 2) crossover anomalies as seen on Lines 4400N to 1900S indicate an extensive (larger than the loop dimensions) conductor of considerable depth extent. Its conductance is greatest in the northern part of the grid.

The high channel crossovers (Channels 6 - 4) seen on the grid are probably due to the change in the conductivity structure of the local geology.

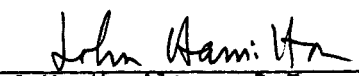
### CONCLUSIONS

A large extensive conductor with a strike length of at least 5 km was defined. Its conductance is greatest in the northern part of the grid.

Report by:

  
 J. Silic, B.Sc.  
 Geophysicist, Cominco Ltd.

Approved for  
 Release:

  
 J.M. Hamilton, P.Eng.  
 Manager, Exploration  
 Cominco Ltd.

## DISTRIBUTION:

Mining Recorder	(2)
Kootenay Exploration	(2)
Western District, Expl.	(1)
Geophysics	(1)

REFERENCE

Lamontagne, Y., 1975

Application of Wideband, Time Domain EM  
Measurements in Mineral Exploration: Doctoral  
Thesis, University of Toronto



APPENDIX I

LEGEND

UTEM DATA SECTIONS

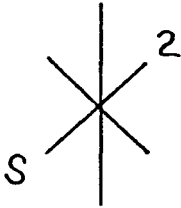
ORDINATE: Amplitude scale is given in %

ABSCISSA: Station or Picket Numbers in Hundreds of Meters

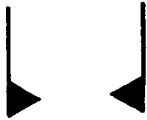
SYMBOL	CHANNEL	MEAN DELAY TIME	
		15 Hz	30 Hz
	1	25.6 ms	12.8 ms
/	2	12.8	6.4
\	3	6.4	3.2
□	4	3.2	1.6
Σ	5	1.6	0.8
△	6	0.8	0.4
7	7	0.4	0.2
⊗	8	0.2	0.1
△	9	0.1	0.05
◇	10	0.05	0.025

LEGEND

UTEM COMPILATION MAPS

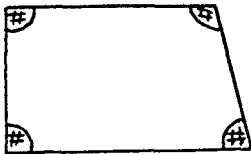


Axis of a crossover anomaly. The number indicates the latest anomalous channel.

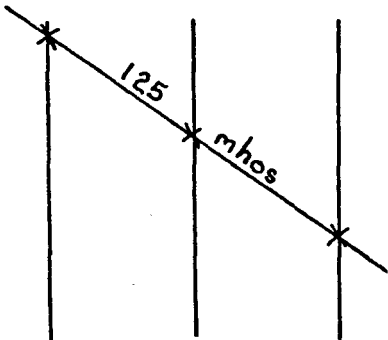


Area where conductivity is higher than average background.

Depth indicated by: S - Shallow ( < 50 m)  
M - Moderate (50-100 m)  
D - Deep ( > 100 m)



Outline of a transmitter loop.



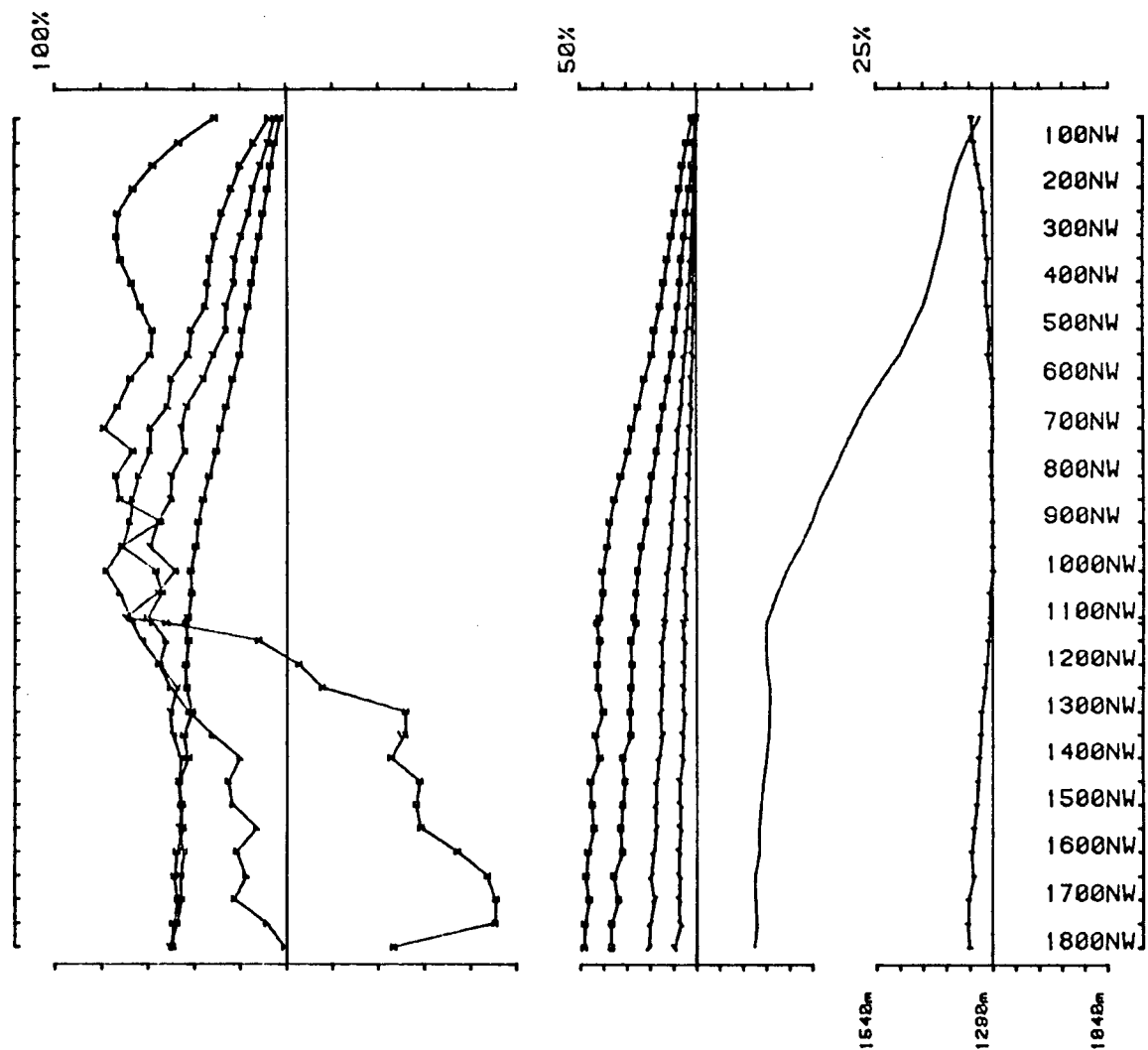
Conductor axis located by crossover anomalies with a conductance determination. The conductance is the interpreted conductivity x thickness of the conductor in mhos (same as Siemens).

Only the principal crossovers are indicated.

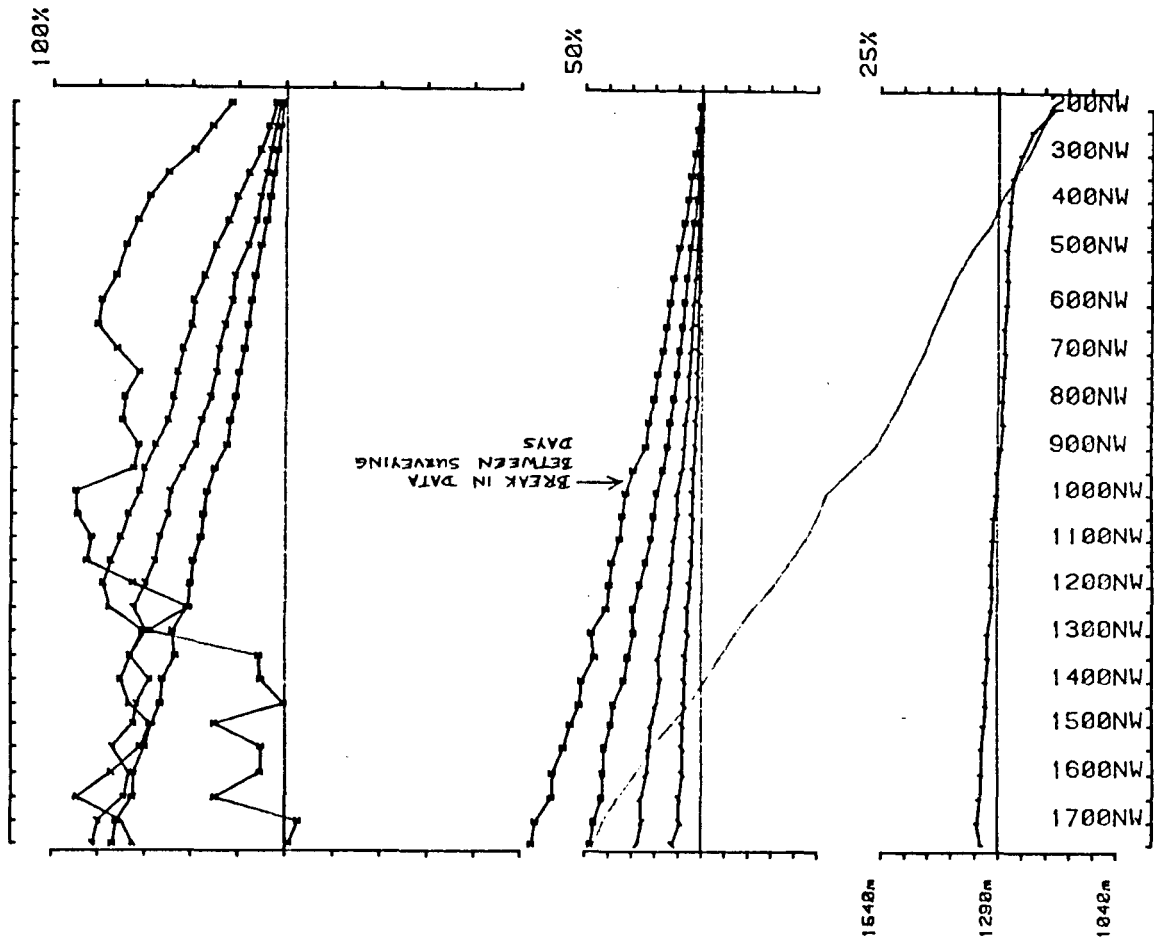
A P P E N D I X II

D A T A S E C T I O N S

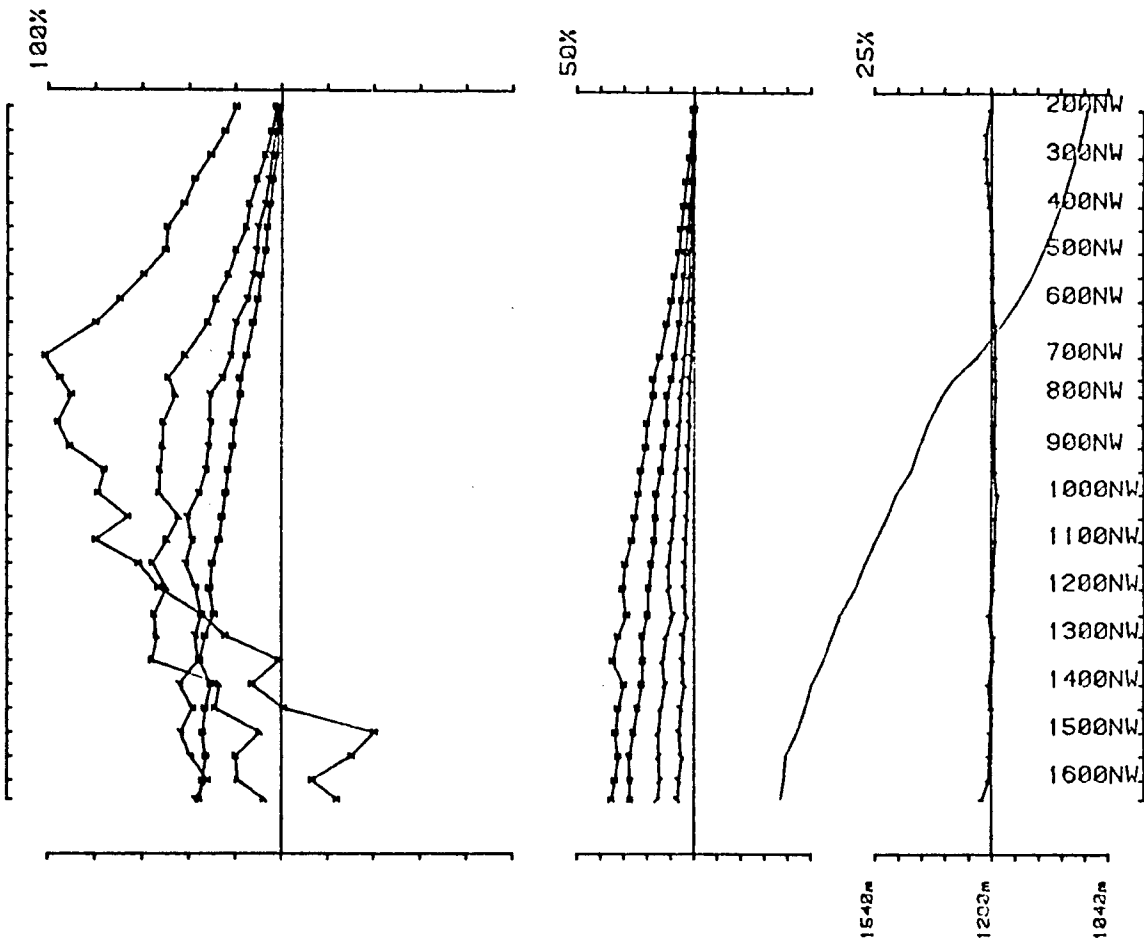
NOTE : CHAINING ERROR  
 200 METERS SHOULD BE  
 ADDED TO ALL PICKET LABELS  
 (ie 0NW = 200NW  
 /800NW = 2000NW)



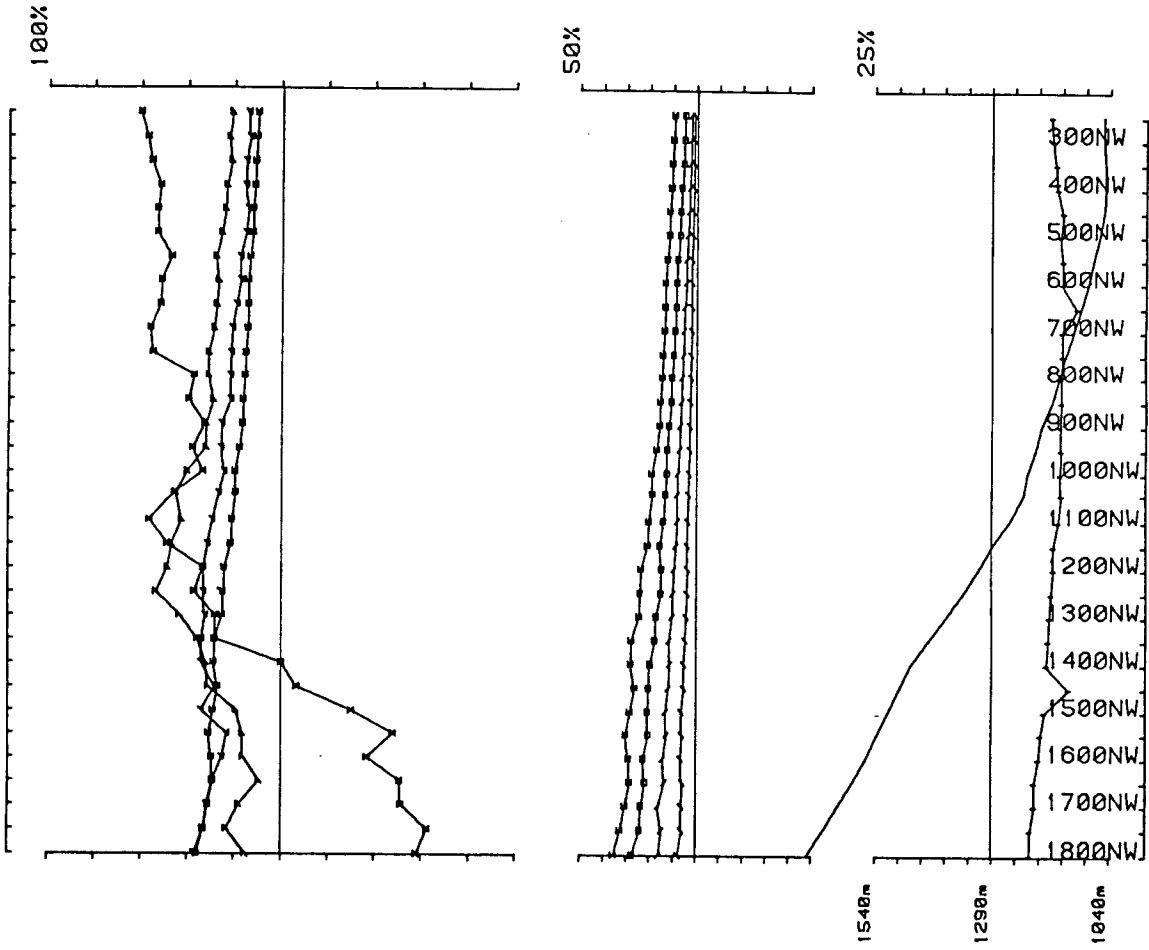
Area VULCAN COMINCO operator IJ&ACH freq(hz) 30.974  
 Loopno 6 Line 5900SW component HZ secondary Ch 1 normalized Ch 1 reduced



Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 6 Line 5400SW component Hz secondary Ch 1 normalized Ch 1 reduced

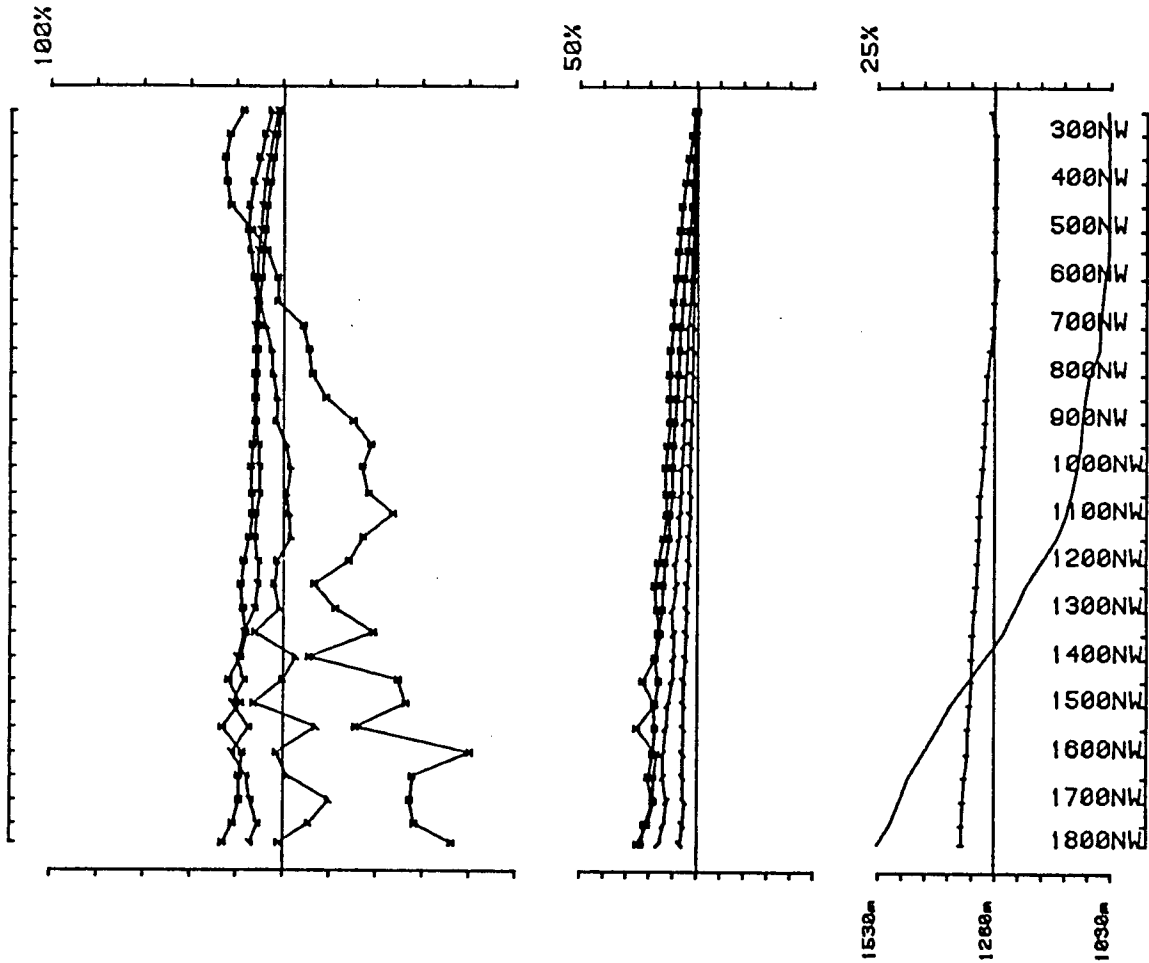


Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 6 Line 4900SW component Hz secondary Ch 1 normalized Ch 1 reduced

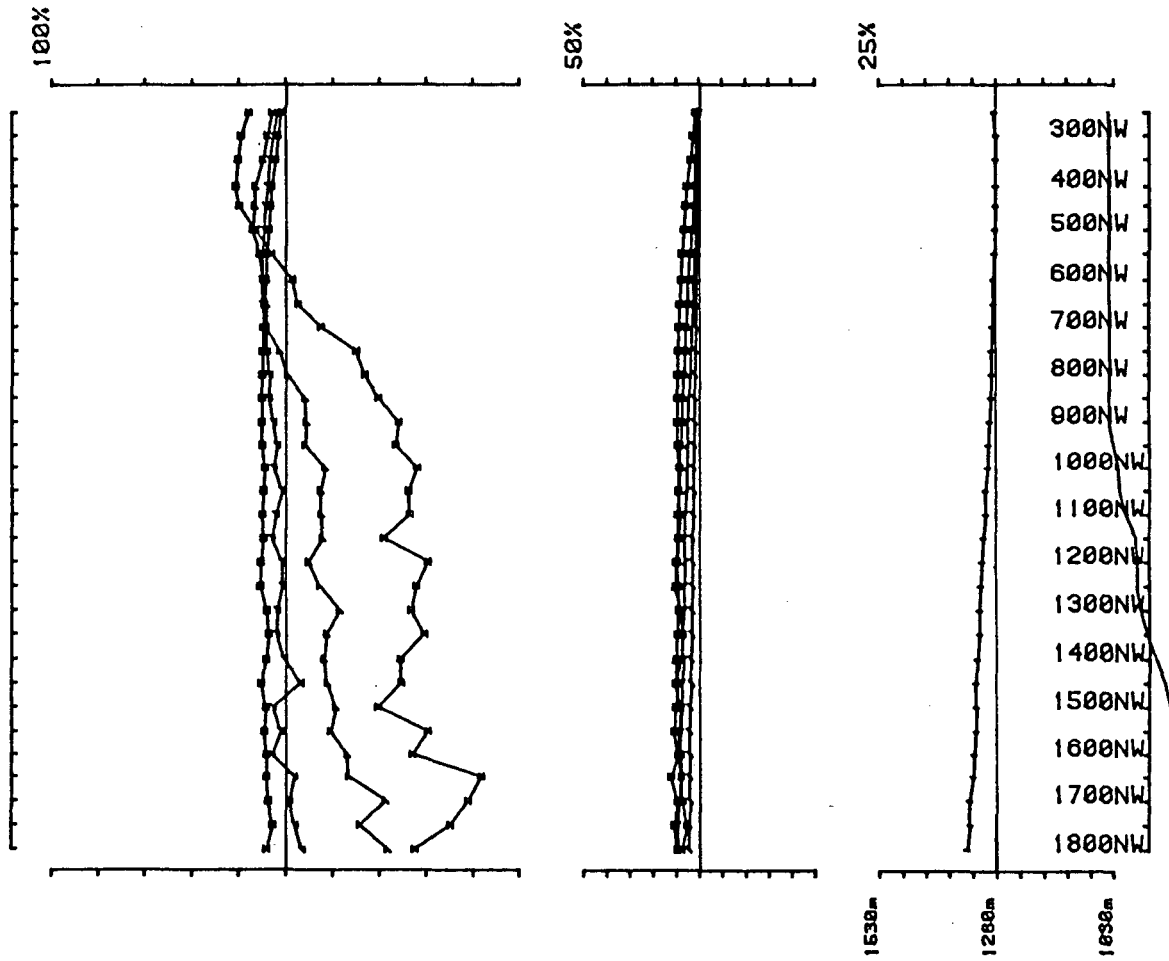


Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 6 Line 4400SW component Hz secondary Ch 1 normalized Ch 1 reduced

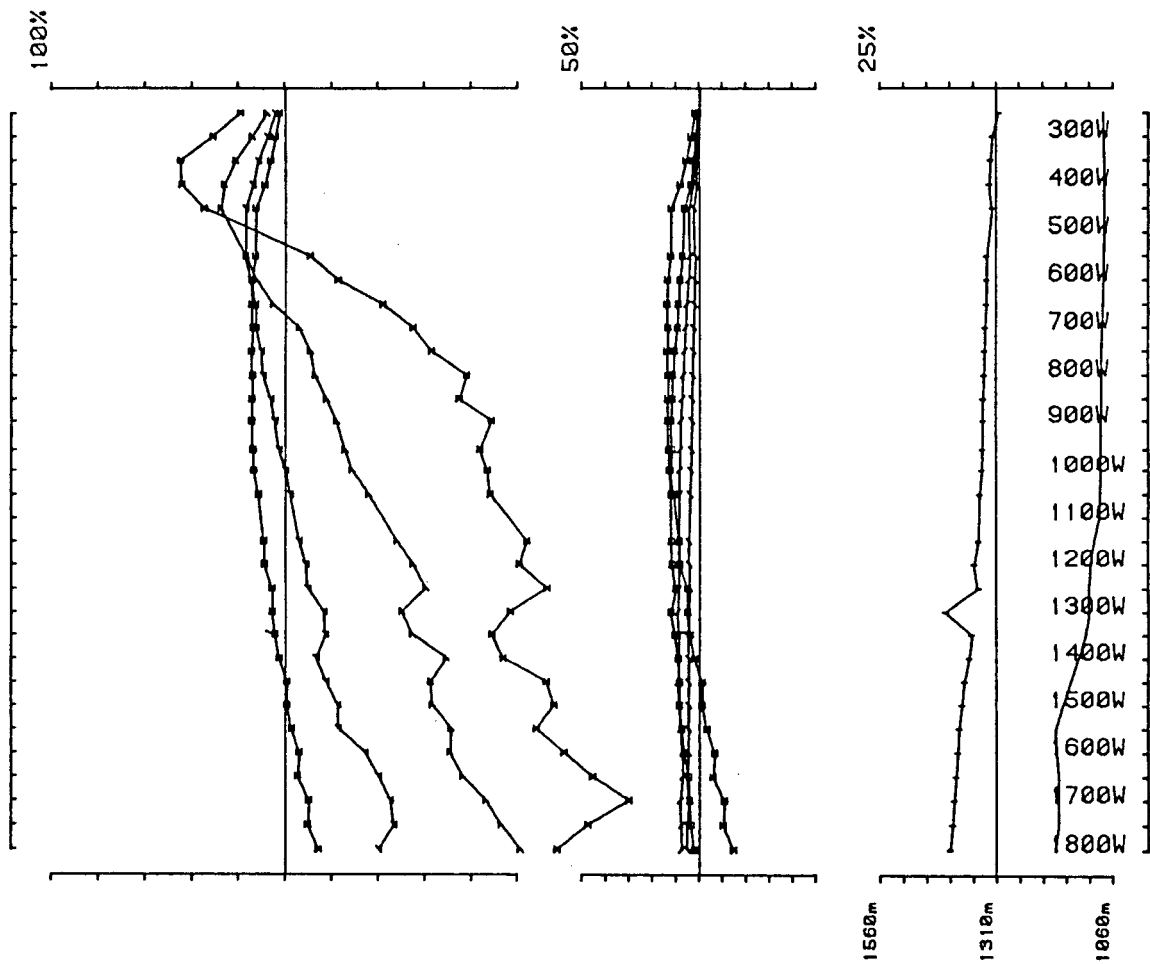




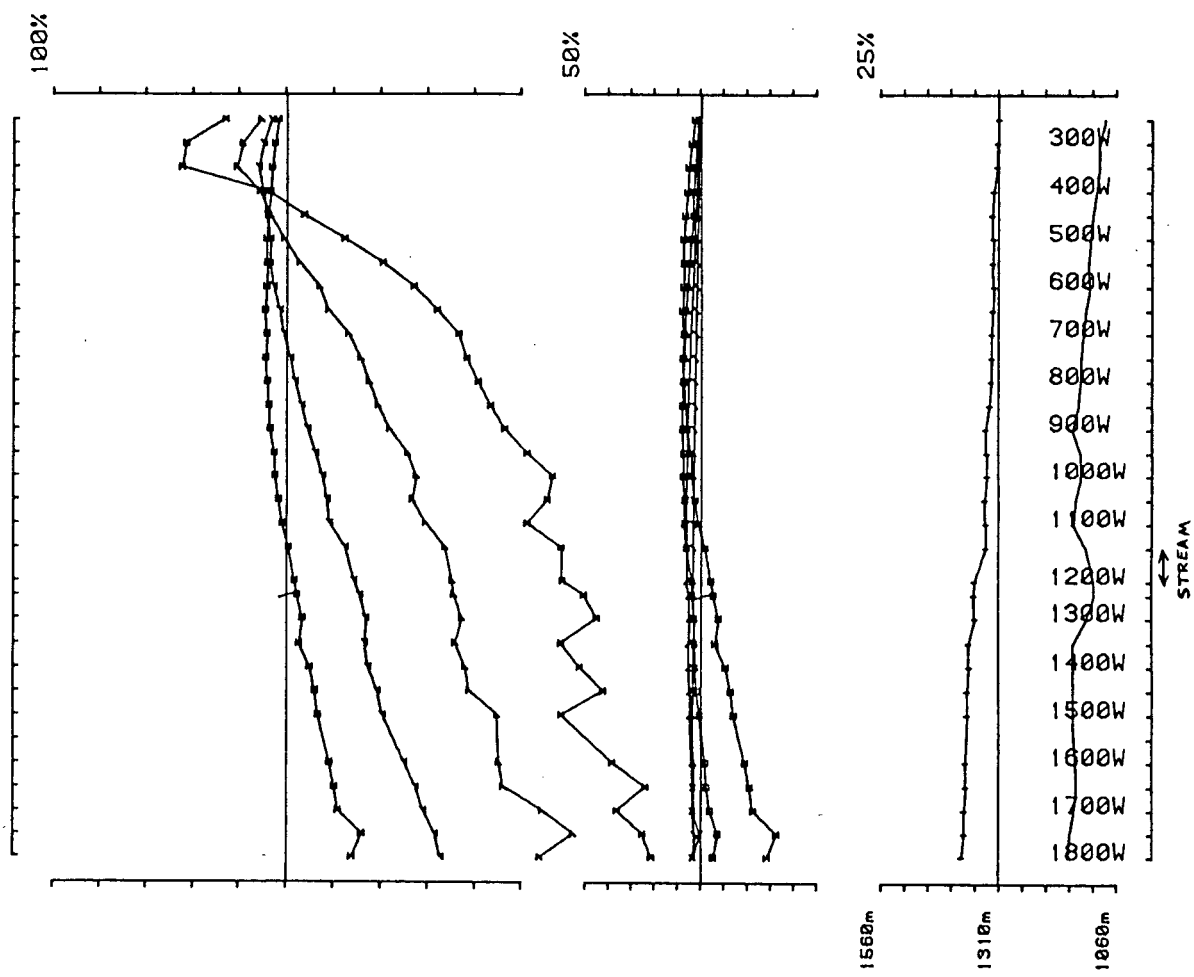
Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 5 Line 3900SW component Hz secondary Ch 1 normalized Ch 1 reduced



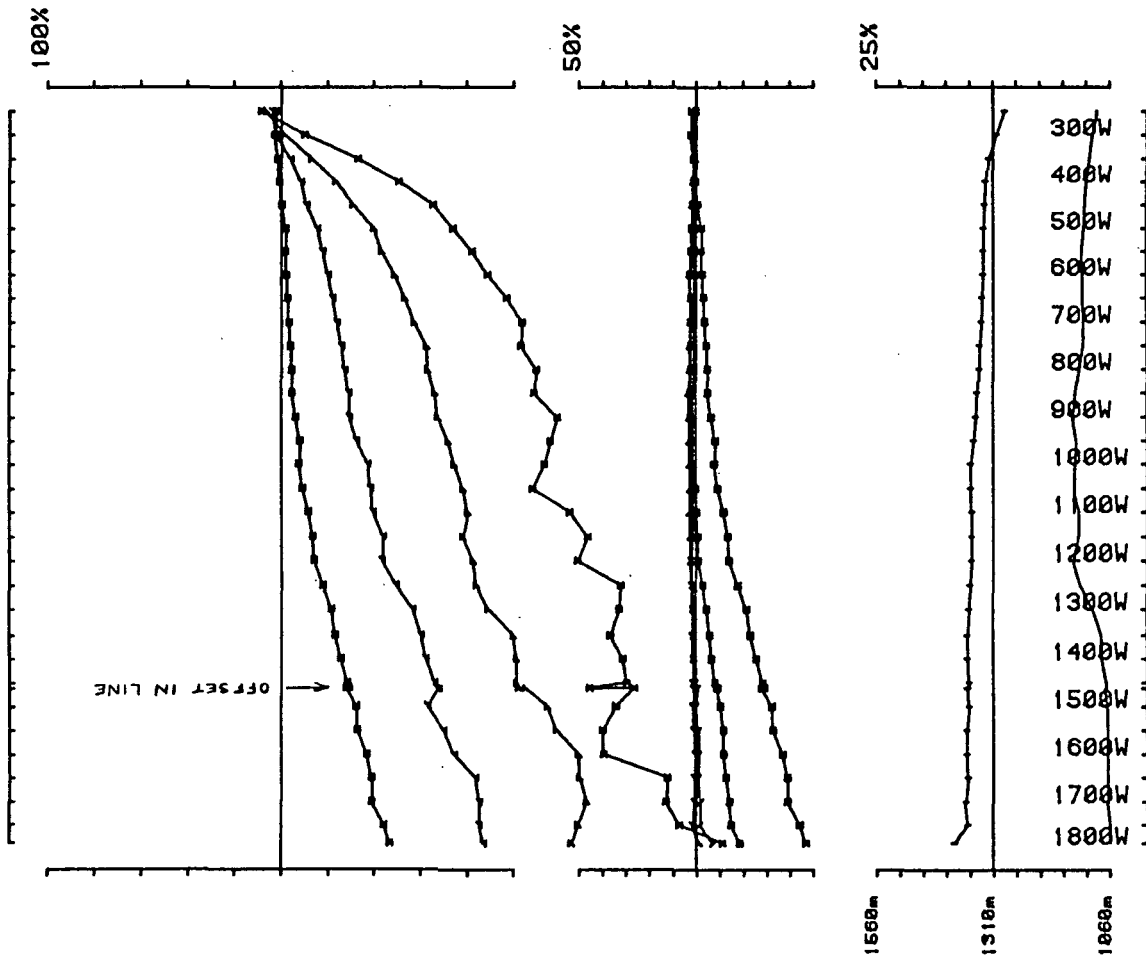
Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 5 Line 3400SW component Hz secondary Ch 1 normalized Ch 1 reduced



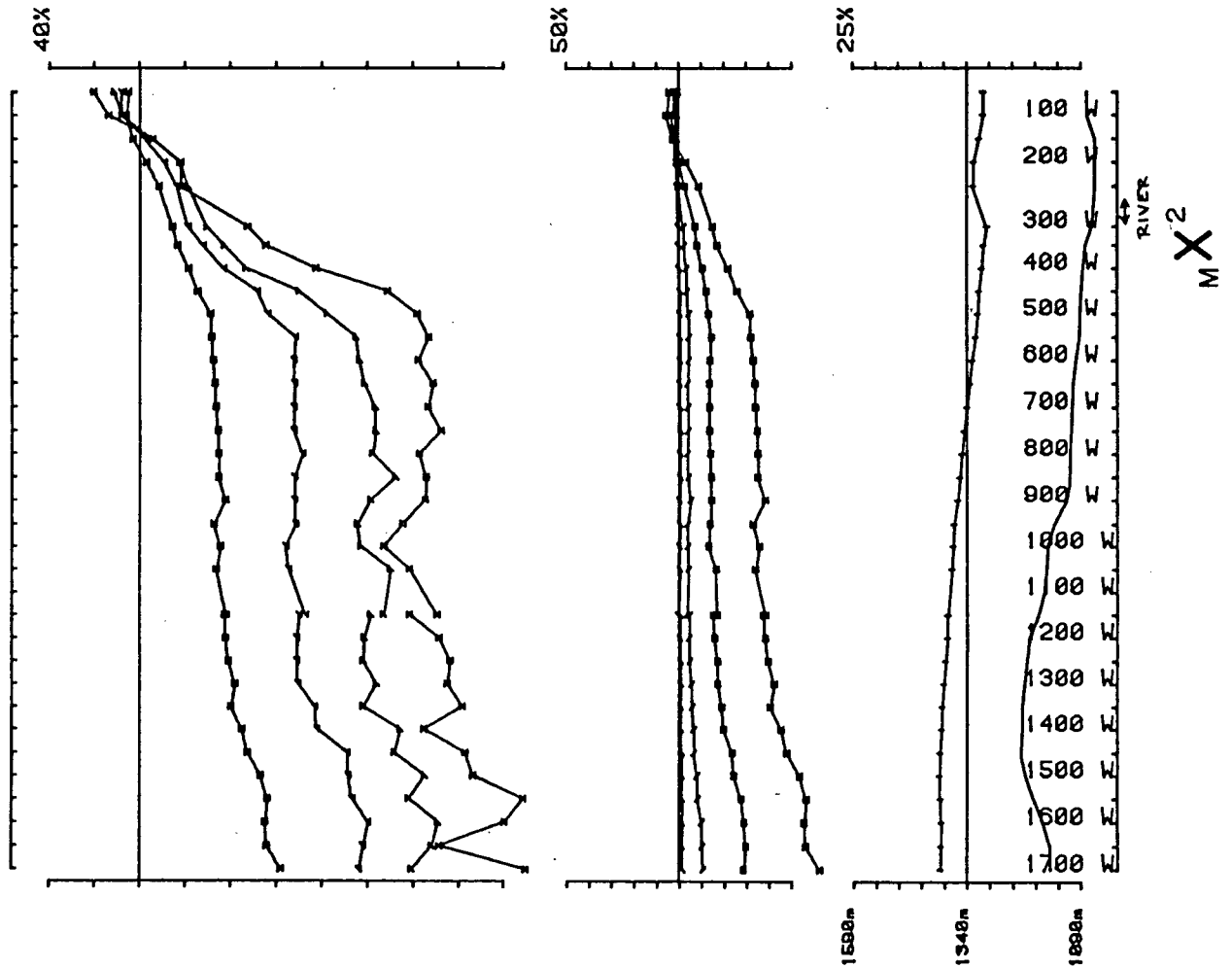
Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 4 Line 2900S component Hz secondary Ch 1 normalized Ch 1 reduced



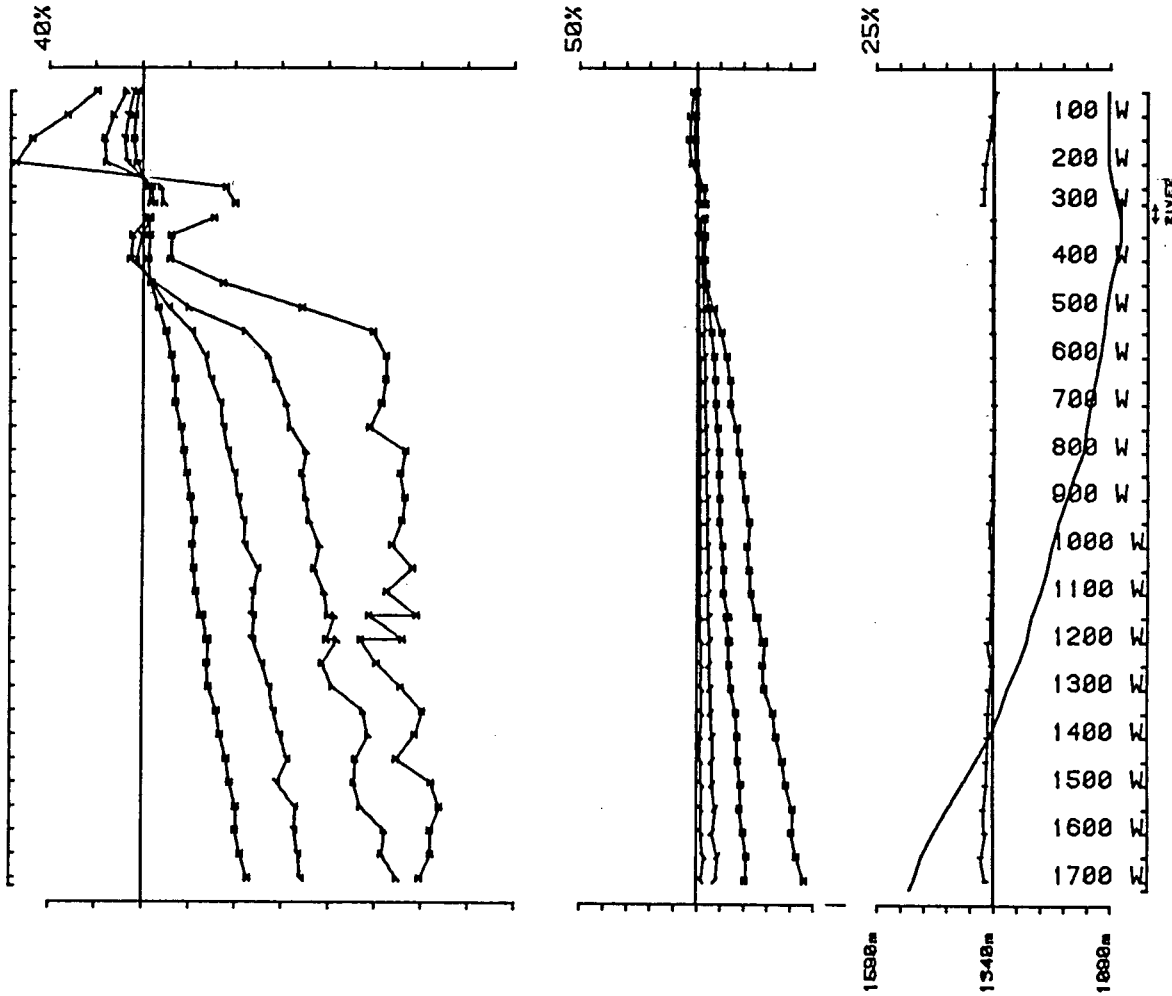
Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 4 Line 2400S component Hz secondary Ch 1 normalized Ch 1 reduced



Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 4 Line 1900S component Hz secondary Ch 1 normalized Ch 1 reduced

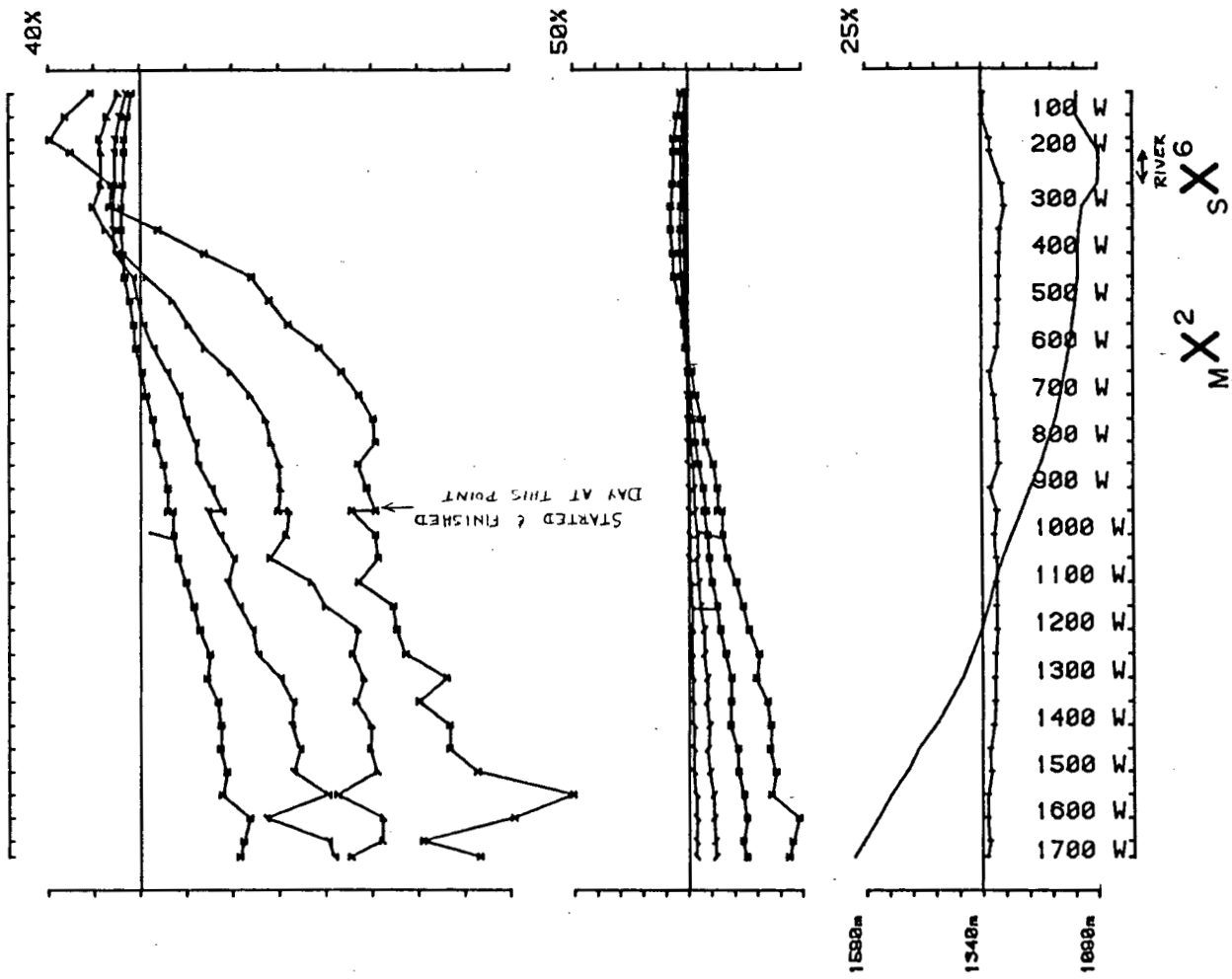


Area VULCAN COMINCO operator BL&AOH&IJ freq(hz) 30.974  
 Loopno 3 Line 1500S component Hz secondary Ch 1 normalized Ch 1 reduced



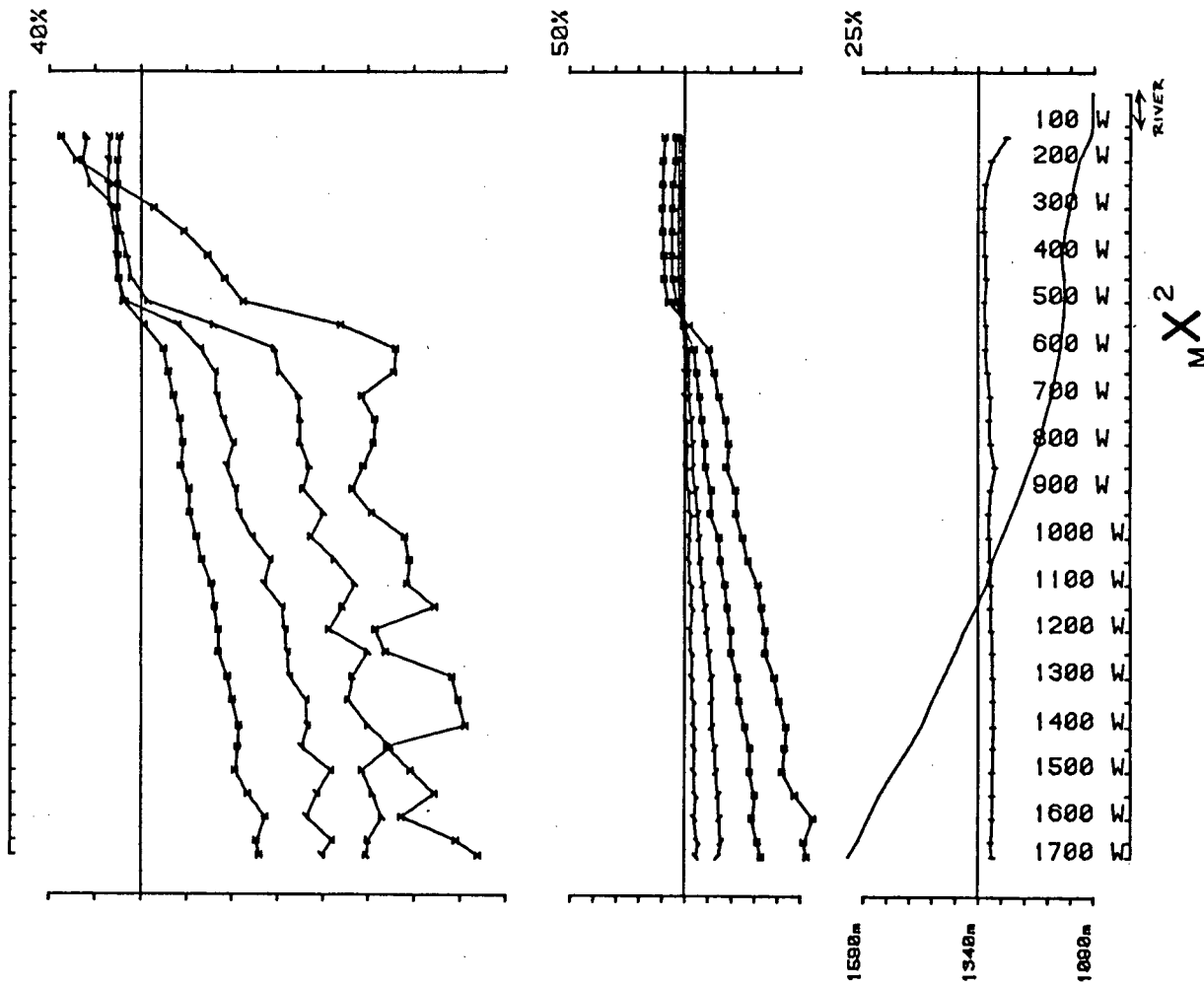
M X<sup>2</sup> S X<sup>4</sup>

Area VULCAN COMINCO operator BL&AOH&IJ freq(hz) 30.974  
 Loopno 3 Line 1000S component Hz secondary Ch 1 normalized Ch 1 reduced

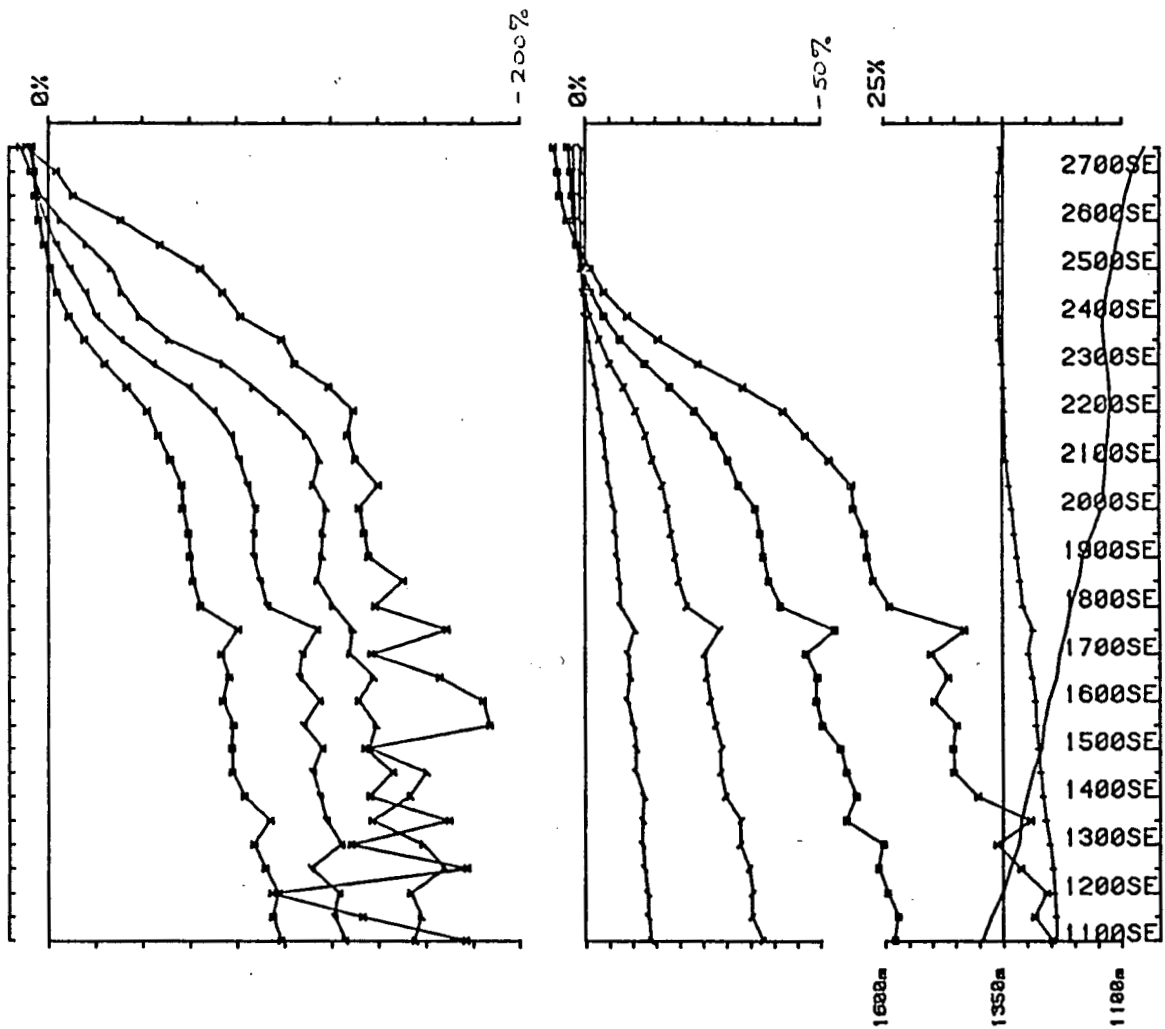


Area VULCAN COMINCO operator BL&AOH&IJ freq(hz) 30.974  
 Loopno 3 Line 500S component Hz secondary Ch 1 normalized Ch 1 reduced

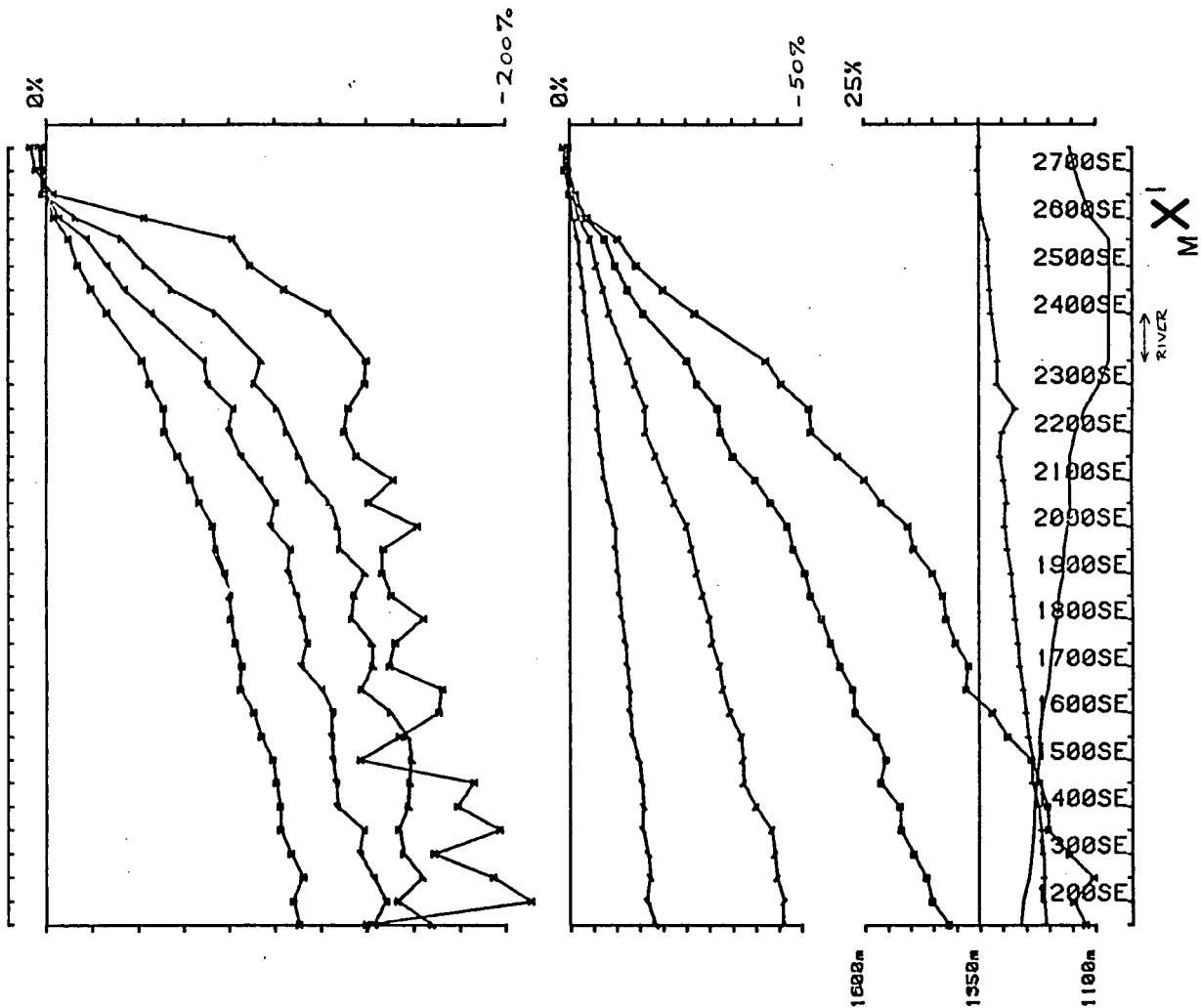




Area VULCAN COMINCO operator BL&AOH&IJ freq(hz) 30.974  
 Loopno 3 Line 0N component Hz secondary Ch 1 normalized Ch 1 reduced

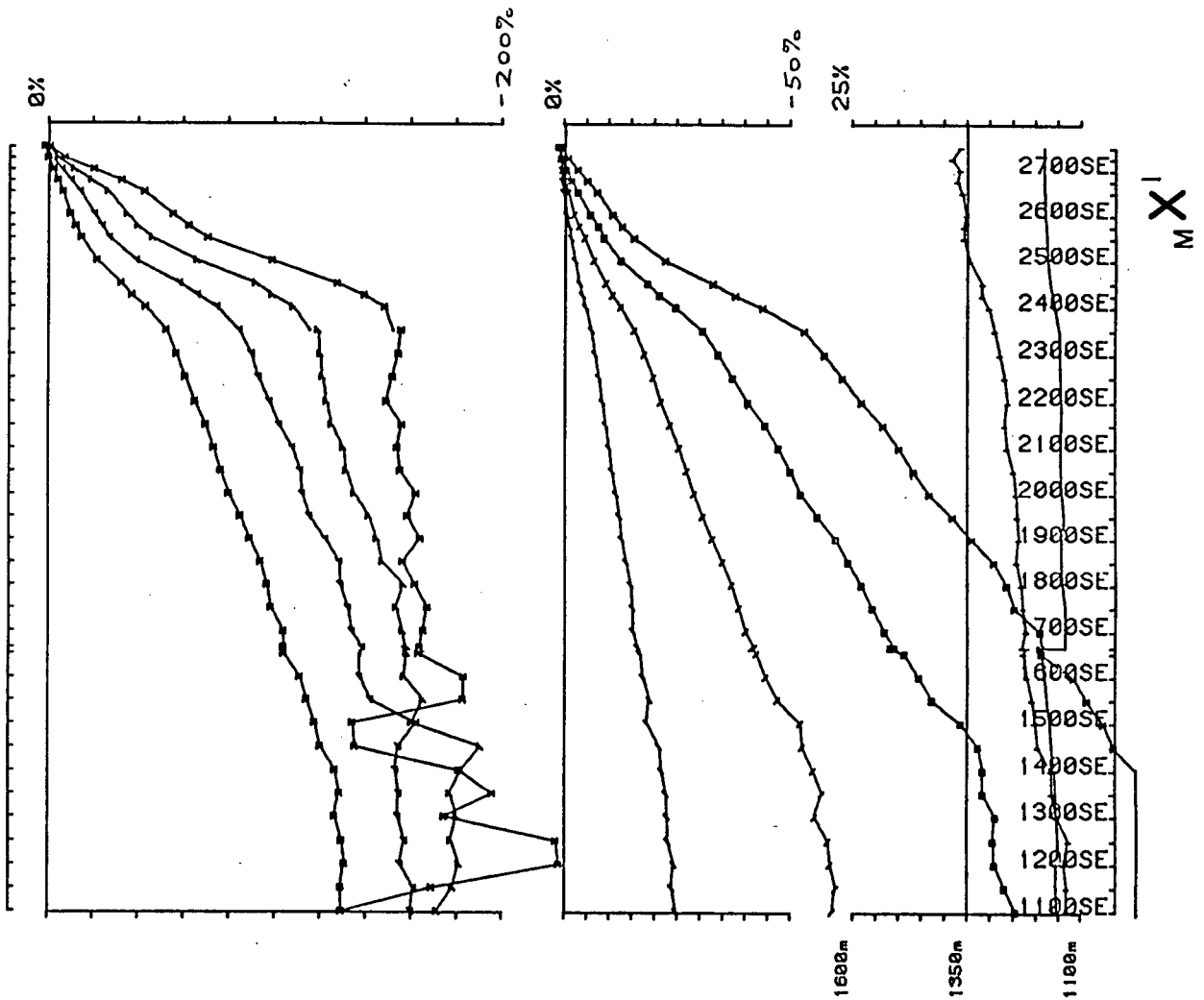


Area VULCAN COMINCO LTD. operator AOH, JUL, IJ freq(hz) 30.974  
 Loopno 2 Line 2000NE component Hz secondary Ch 1 normalized Ch 1 reduced .

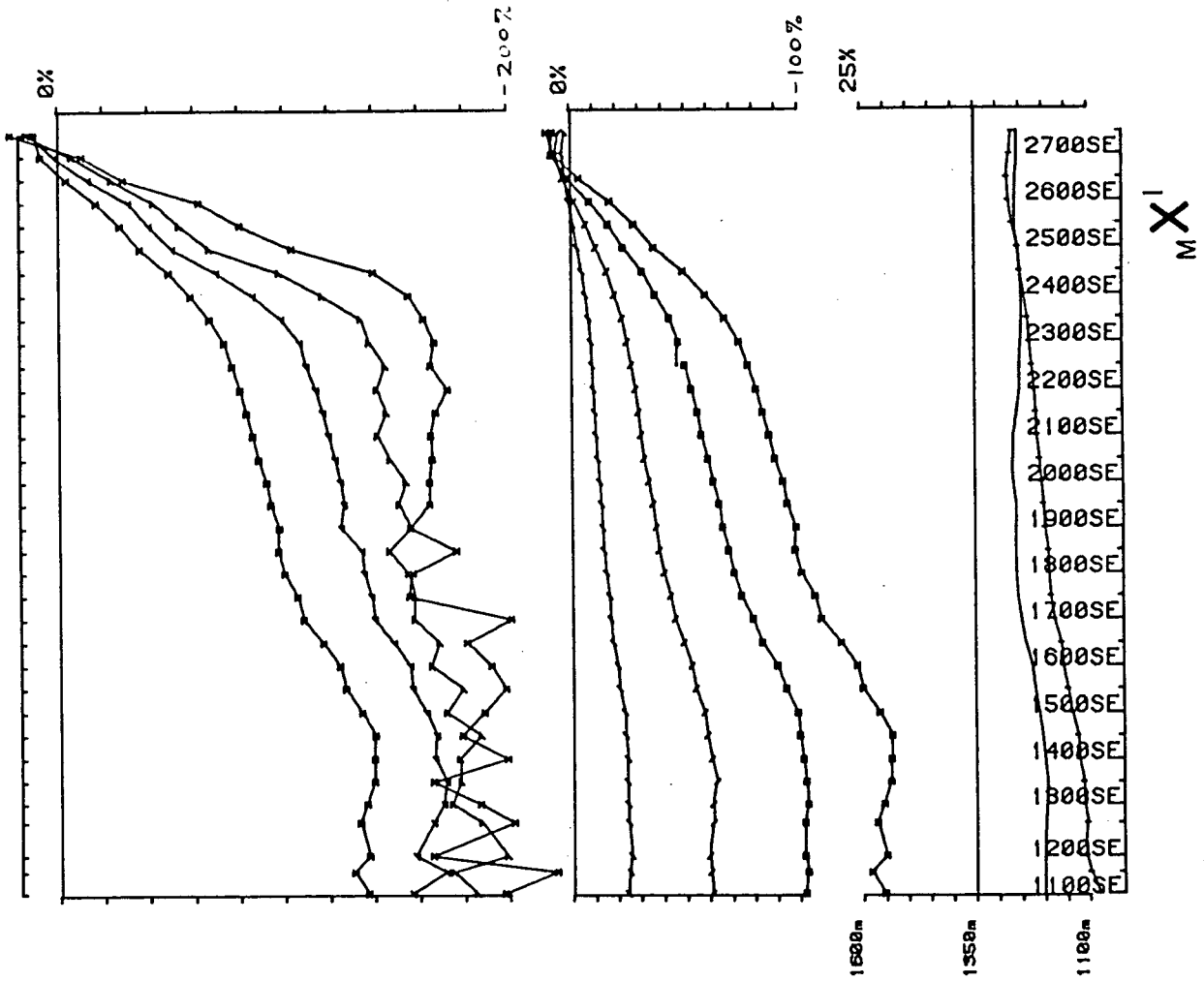


Area VULCAN COMINCO LTD. operator AOH, JUL, IJ freq(hz) 30.974  
 Loopno 2 Line 2400NE component Hz secondary Ch 1 normalized Ch 1 reduced

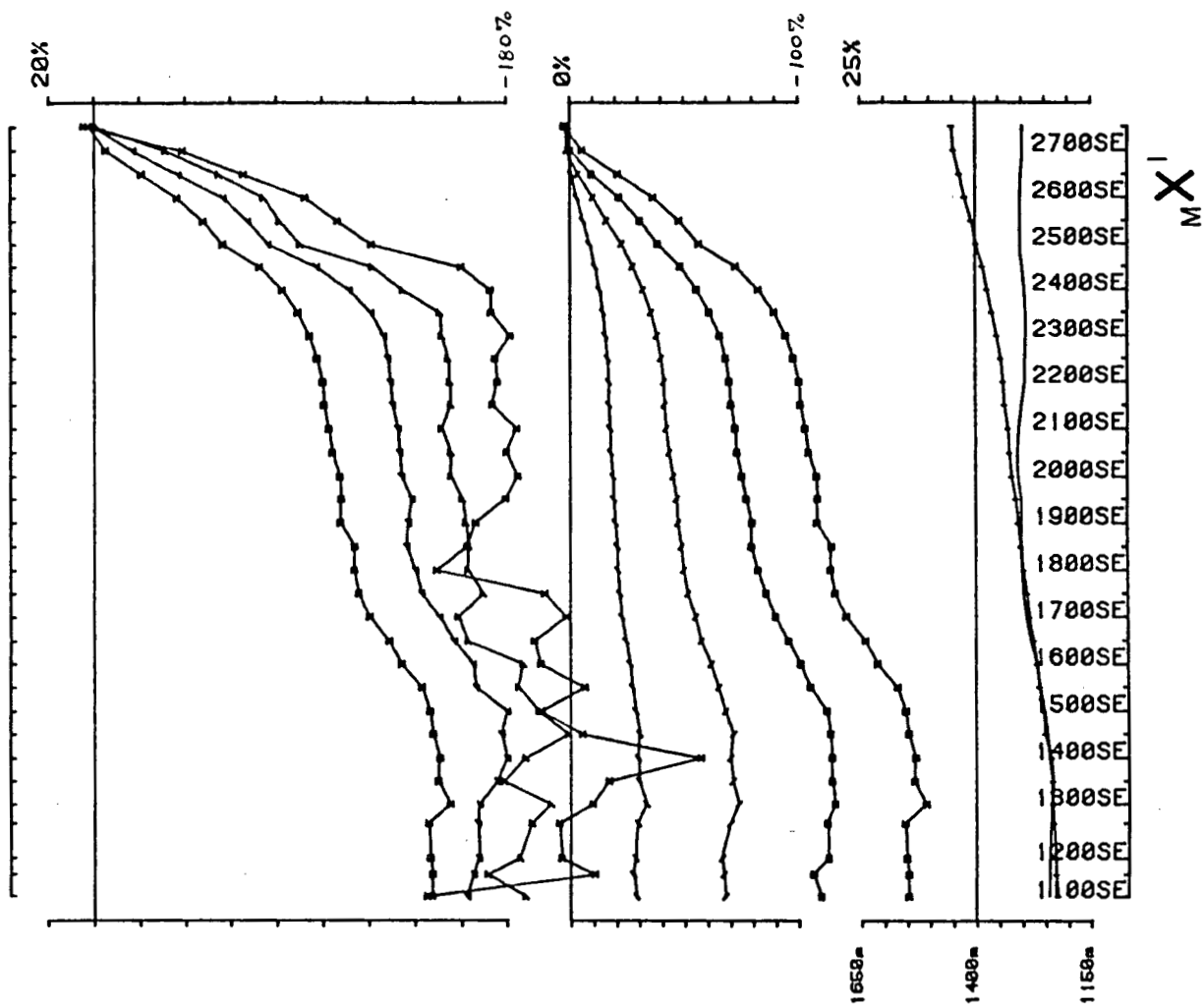
NOTE: THE DISTANCE ACROSS  
 THE RIVER WAS NOT  
 CHAINED, BUT AN ESTIMATE  
 OF 100 METRES WORKED  
 WELL. THE DISTANCE BETWEEN  
 2400E AND 2450E WAS  
 CHANGED FROM 25.0 METRES  
 TO 50.0 METERS WITH  
 BETTER CH 1 RESULTS.  
 AN ADDITIONAL CHAINING  
 ERROR OCCURS AT 2250E.



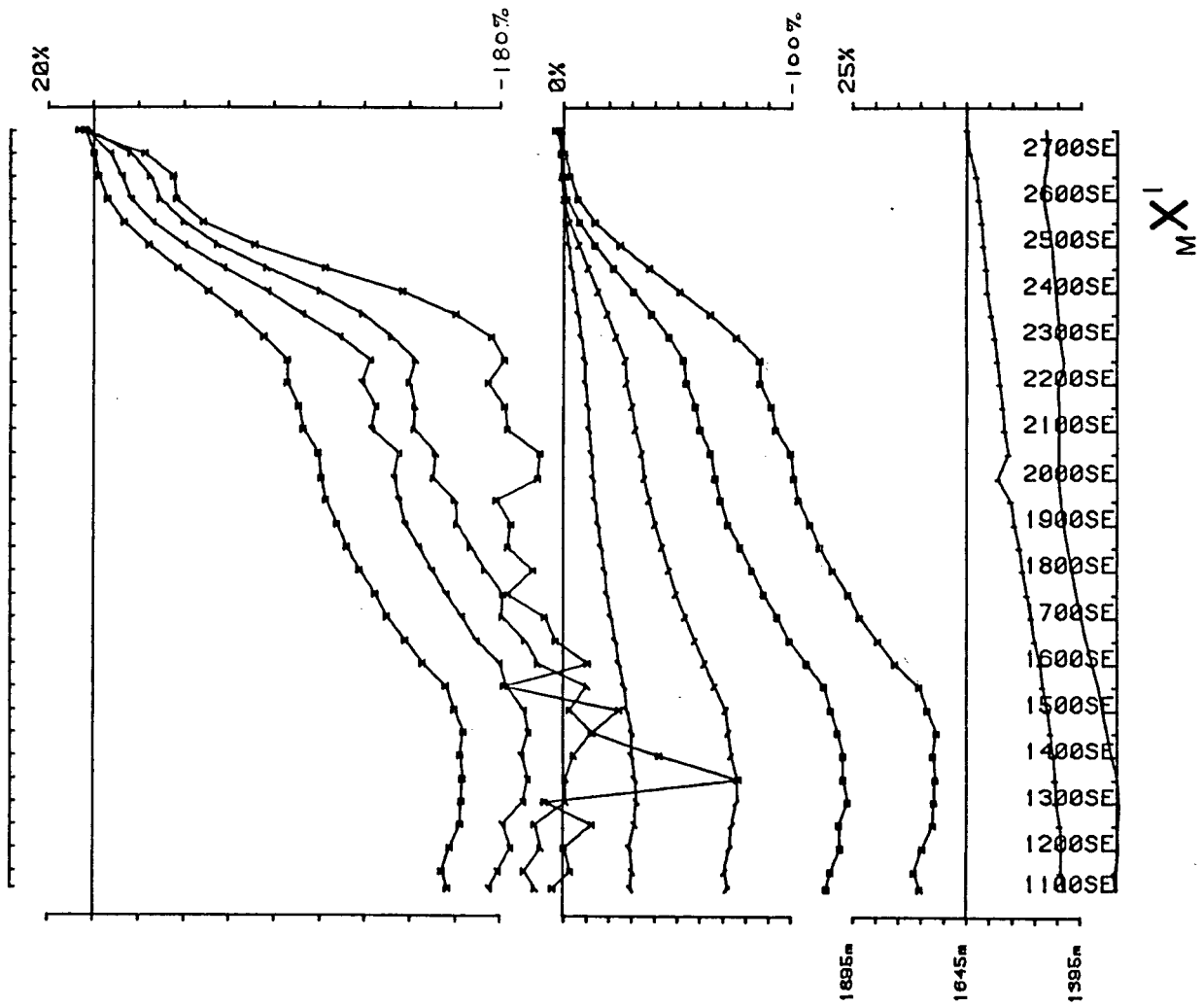
Area VULCAN COMINCO LTD. operator AOH, JUL, IJ freq(hz) 30.974  
 Loopno 2 Line 2800NE component Hz secondary Ch 1 normalized Ch 1 reduced



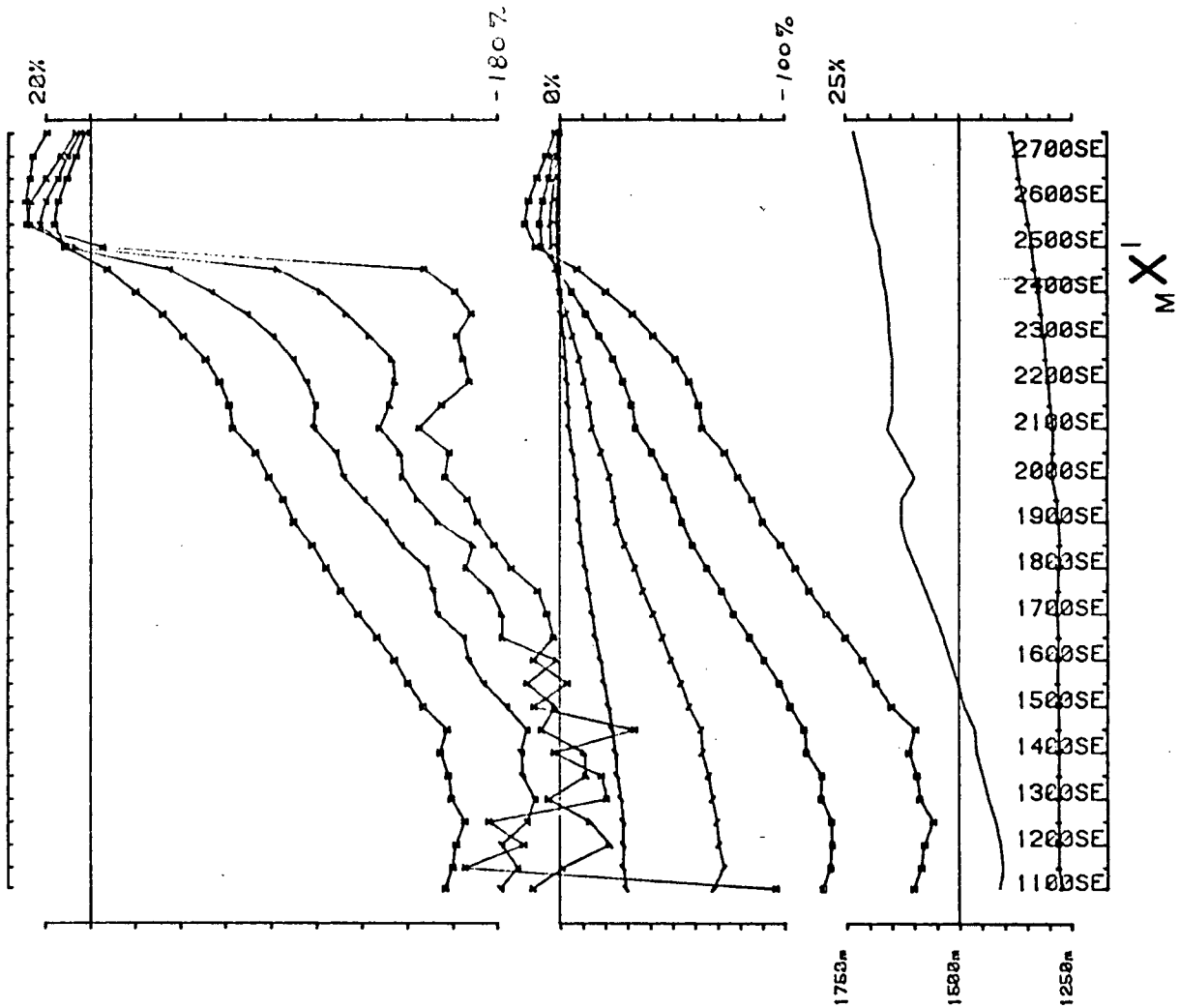
Area VULCAN COMINCO LTD. operator AOH, JVL, IJ freq(hz) 30.974  
 Loopno 2 Line 3200NE component Hz secondary Ch 1 normalized Ch 1 reduced.



Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 1 Line 3200NE component Hz secondary Ch 1 normalized Ch 1 reduced

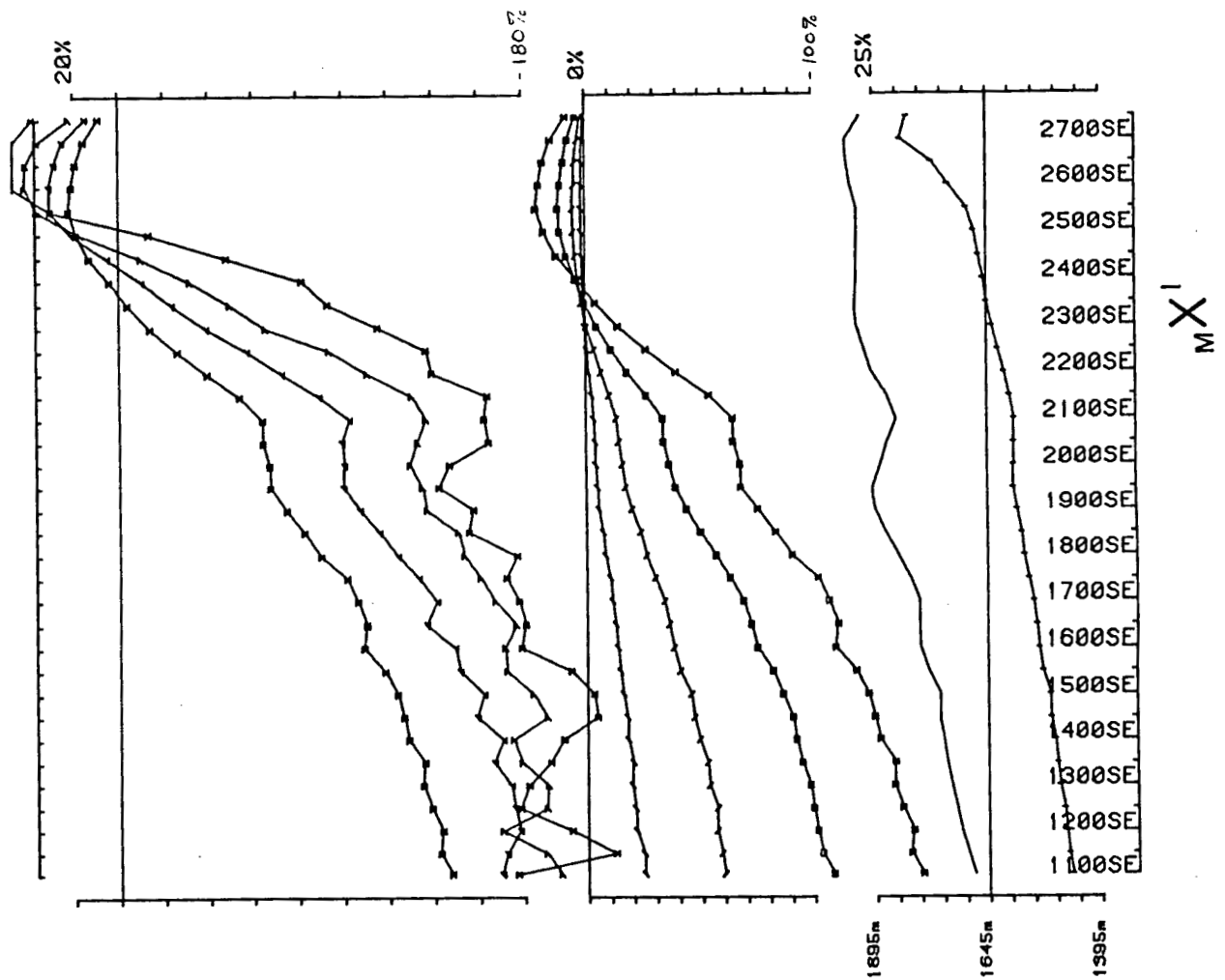


Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 1 Line 3600NE component Hz secondary Ch 1 normalized Ch 1 reduced



Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974  
 Loopno 1 Line 4000NE component Hz secondary Ch 1 normalized Ch 1 reduced





Area VULCAN COMINCO operator IJ&AOH freq(hz) 30.974

Loopno 1 Line 4400NE component Hz secondary Ch 1 normalized Ch 1 reduced

APPENDIX III

IN THE MATTER OF THE B.C. MINERAL ACT  
AND IN THE MATTER OF A GEOPHYSICAL PROGRAMME  
CARRIED OUT ON THE VULCAN 4 TO 11  
AND REDD 1 TO 3 CLAIMS  
LOCATED 45 KM WEST OF KIMBERLEY, B.C.  
IN THE FORT STEELE MINING DIVISION OF THE  
PROVINCE OF BRITISH COLUMBIA, MORE PARTICULARLY  
N.T.S. 82F/16W & 82F/19W

S T A T E M E N T

I, JOVAN SILIC, of the City of Vancouver in the Province of British Columbia, make oath and say:-

1. THAT I am employed as a geophysicist by Cominco Ltd. and as such have a personal knowledge of the facts to which I hereinafter depose;
2. THAT annexed hereto and marked as "Exhibit A", to this statement is a true copy of expenditures incurred on geophysical survey on the VULCAN AND REDD mineral claims;
3. THAT the said expenditures were incurred during the months of June and July, 1985, for the purpose of mineral exploration of the above-named claims.

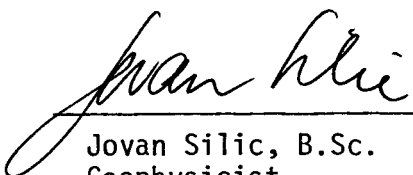
  
\_\_\_\_\_  
Jovan Silic, B.Sc.  
Geophysicist  
Cominco Ltd.

EXHIBIT "A"

STATEMENT OF GEOPHYSICAL EXPENDITURES - 1985

VULCAN 1 TO 11 AND REDD 1 TO 3 CLAIMS

(1) SALARIES

Preparation, Field Work, Mob/Demob,  
Interpretation, etc.

\$ 19,343.75

Geophysicists:

J.J. Lajoie	3 days
I. Jackisch	24 days
A.P. O'Hara	25 days

Assistants:

S. Kemp	20 days
P. Fergus	19 days
D. Ransom	18 days

(2) EQUIPMENT AND TRUCK RENTAL

4,012.00

(3) EXPENSE ACCOUNTS

(Hotels, Meals, Transportation)

3,729.60

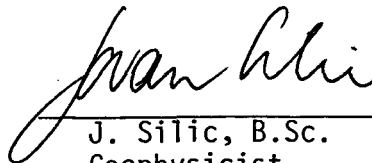
TOTAL COST

---

\$ 27,085.35

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I certify this to be a true Statement of Expenditures for the geophysical survey on the Vulcan 4 to 11 and Redd 1 to 3 claims in 1985.



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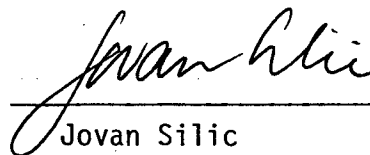
J. Silic, B.Sc.  
Geophysicist  
Cominco Ltd.

APPENDIX IV

CERTIFICATION

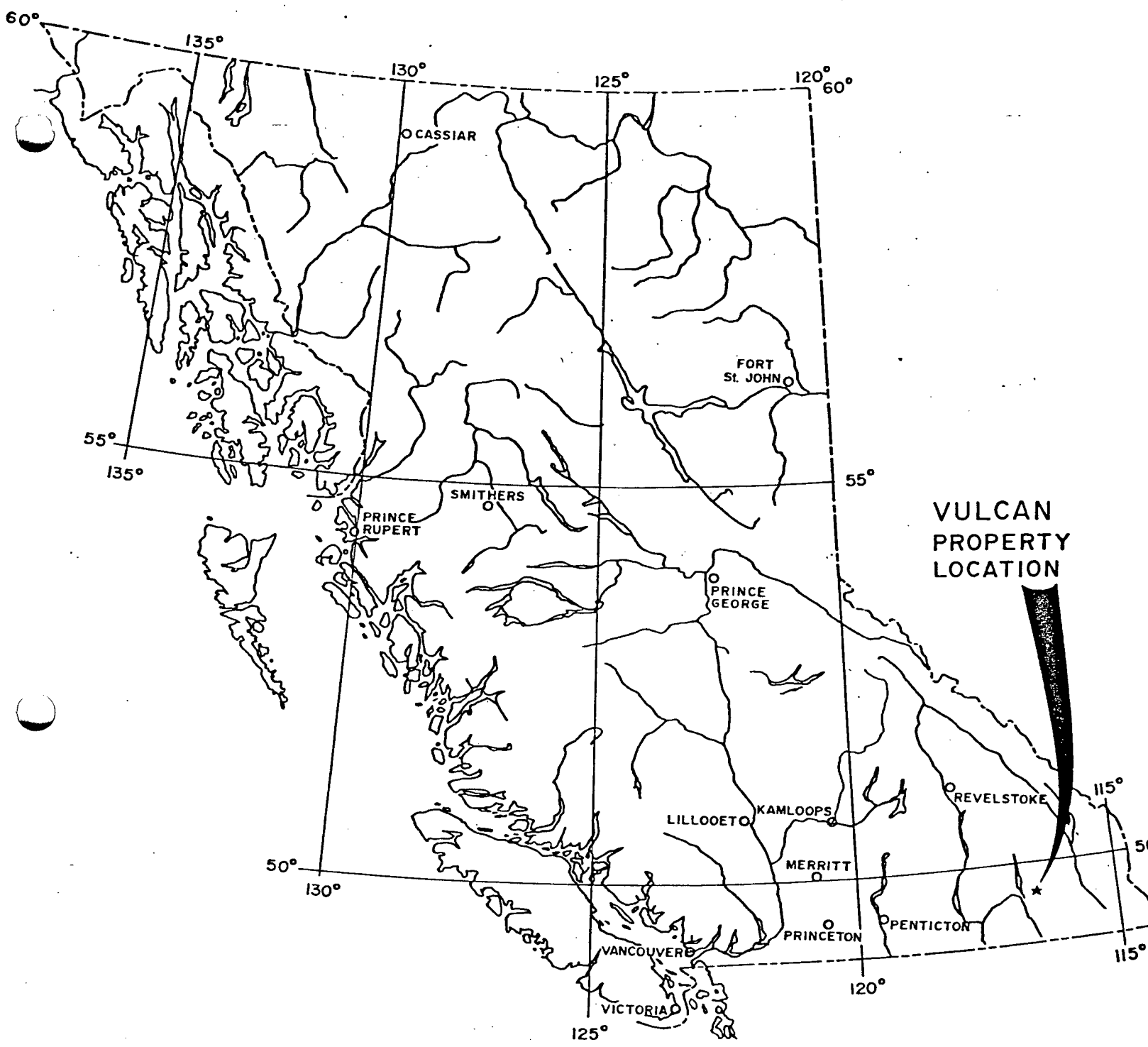
I, JOVAN SILIC, of 2975 West 15th Avenue, in the City of Vancouver, in the Province of British Columbia, do hereby certify:-

- (1) I graduated from the University of Western Australia in 1971 with Honours B.Sc. in Physics.
- (2) I have worked in mineral exploration since 1971.



---

Jovan Silic  
Geophysicist  
Cominco Ltd.



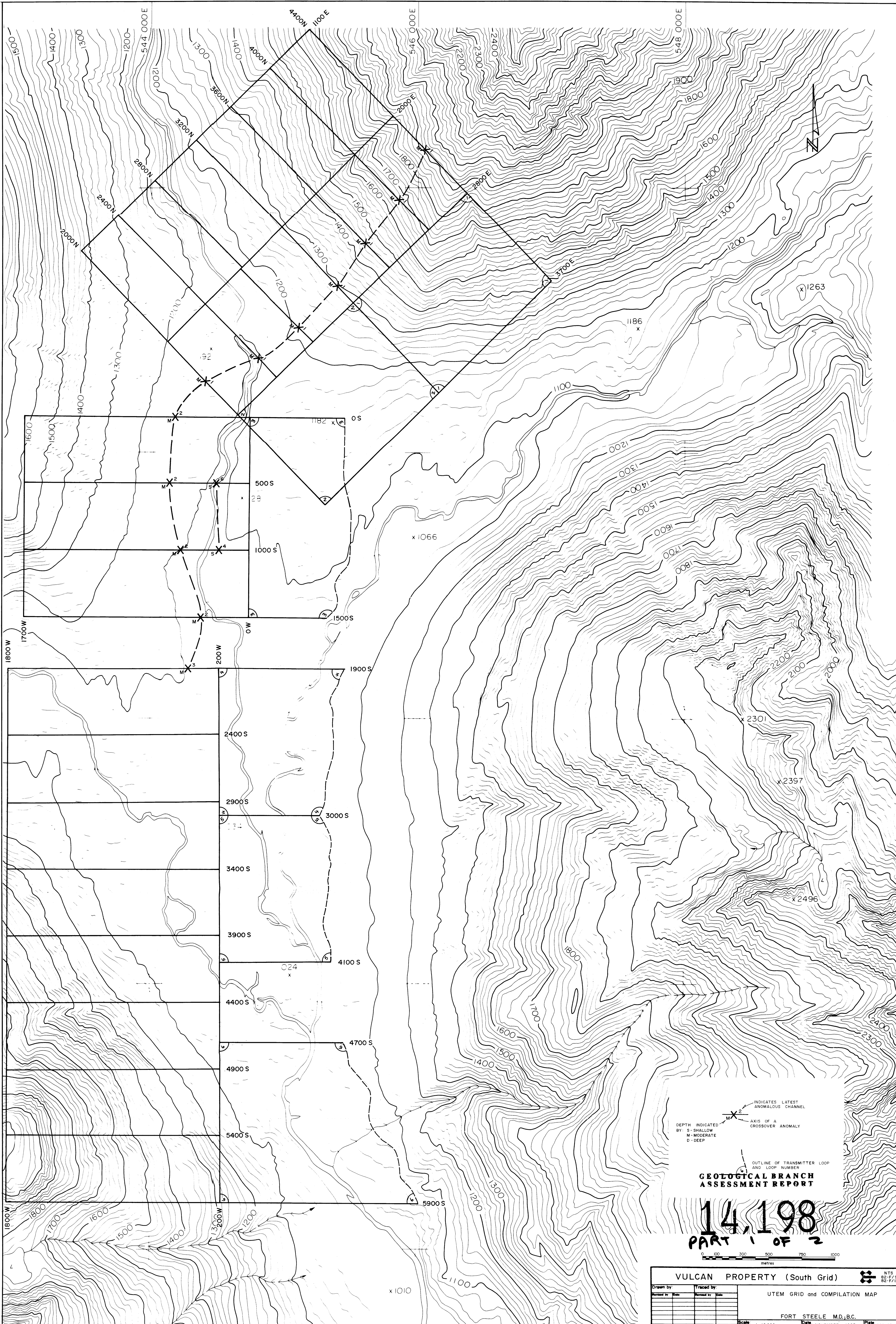
VULCAN  
PROPERTY  
LOCATION

0 100 200 300 400 Kilometres

0 100 200 Miles

# VULCAN PROPERTY GENERAL LOCATION MAP



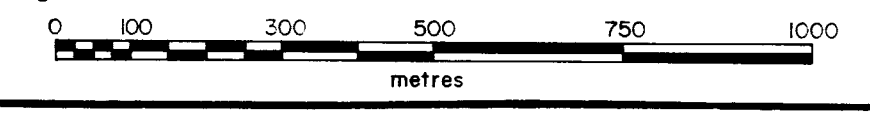


INDICATES LATEST ANOMALOUS CHANNEL  
 AXIS OF A CROSSOVER ANOMALY  
 DEPTH INDICATED BY:  
 S - SHALLOW  
 M - MODERATE  
 D - DEEP

OUTLINE OF TRANSMITTER LOOP AND LOOP NUMBER

**GEOLOGICAL BRANCH  
 ASSESSMENT REPORT**

**14,198**  
**PART 1 OF 2**



VULCAN PROPERTY (South Grid)		NTS 82-F/9 82-F/16
Drawn by	Traced by	
Revised by	Revised by	UTEM GRID and COMPILATION MAP
FORT STEELE M.D., B.C.		Scale 1:10,000 Date NOVEMBER 1985 Plate 289-85-1

x 1010



SECTION  
ASSASSIN

HUNCH  
PORT

1 May 1985  
PART 1 OF 2

K O O T E N A

VULCAN 1 VULCAN 2

VULCAN 3

VULCAN 4

VULCAN 5

VULCAN 6

VULCAN 7

NTS 82 EX 16 W

NTS 82

VULCAN 8

VULCAN 9

REDD 1

REDD 6



### VULCAN PROPERTY (South Grid)

Comins NTS  
82-F/9  
82-F/16

Drawn by:	Traced by:		
Revised by	Date	Revised by	Date

CLAIM and GRID LOCATION MAP  
VULCAN CLAIMS 4-11; REDD CLAIMS 1-3

FORT STEELE M.D.; B.C.

Scale 1: 50,000

Date NOVEMBER 1985

Plate 289-85-1